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AUTHOR Pearson, Michael; And Others
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ABSTRACT

A study explored the extent to which students' learning was facilitated by the use of computerized multimedia presentations in a large lecture course. Subjects, 168 students at a midsize eastern university who enrolled in an introductory mass communication course that used computer assisted media presentations, completed questionnaires about their learning experiences. Results indicated that: (1) learning styles and multimedia presentations were not related; (2) two-thirds of the students reported that they learned more when multimedia was used; (3) virtually all of the remaining one-third of the students were neutral and were evenly distributed across all four learning styles (converger, diverger, assimilator, and accommodator); and (4) 94% of the students reported that the use of multimedia segments made the class entertaining. Findings suggest that the pedagogical benefits of computerized multimedia classroom presentations are equally available to students of all learning styles. (Contains three tables of data.) (RS)

The Relationship Between Student Perceptions of the Multimedia Classroom and Student Learning Styles

by
Michael Pearson, Jane Folske, Denise Paulson
and Cynthia Burggraf

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Michael Pearson
Associate Professor
515 Main Hall
West Chester University
West Chester, PA 19383

Jane Folske
Psychometric Technician
National Board of Medical Examiners
3930 Chestnut Street
Philadelphia, PA 19104

Denise Paulson
Student
515 Main Hall
West Chester University
West Chester, PA 19383

Cynthia Burggraf
Associate Professor
Communication Dept.
University of Delaware
Newark, DE 19716

Rationale:

Even though personal computers have been around for less than twenty years, they have become a common sight in many areas of our educational institutions. Personal computers can be found in faculty offices where they are used for research and class preparation, in student dorms where they are used for document preparation, in libraries for research, at kiosks around campus for information and on staff desks to name this is certainly not a complete list of either the places or functions of the now ubiquitous personal computer. However, in classrooms, computers are more rare than chalk, overheads and VCRs. The direct learning use of computers is generally limited to two areas: Computer Based Training (CBT) and in a growing number of universities, Multimedia Classroom presentations. Typically, the use of computers in pedagogical settings has been of the CBT type: that is, computers have been used as an integral part of many types of classes in the capacity of providing individualized tutorials, remedial work and advanced learning programs. This use of computers is characterized by the one-on-one nature of interaction wherein the student is sitting by herself at an individual computer or computer station. Recently, however, a new use of computers in pedagogical settings has been developed. That is, technological advances in hardware capabilities have been developed that allow the personal computer to generate/control digitized video and audio source material. This, along with the creation of easy-to-use presentation programs such as PODIUM and Powerpoint allow the professor to replace the traditional small (and especially) large-lecture classroom presentation with a computerized multimedia presentation.

Typically in large-lecture classes, the professor lectures while the overhead projects handwritten or prepared information onto a large screen in the front of

the classroom or auditorium. With new computerized multimedia technologies, however, the professor can integrate notes, graphics, diagrams, full-motion video segments, audio segments, text, overlays into a seamless classroom presentaton. In addition, these programs allow the professor to launch any other computer program he or she may wish to demonstrate to the class without actually leaving the presentation program.

As excited as many professors are about this new advance in multimedia courses, little is currently actually known about its effect on students' learning of course materials. Some research, on one hand, suggests that computerized multimedia classes should enhance student learning tremendously because numerous studies show that children who have been exposed to television all of their lives develop styles of cognitive processing of information that is attuned to the fast-paced, dynamic, and multi-imaged format that is typical of entertainment programming (McLuhan, 1964). There is, however, another body of literature from the field of education that suggests that the use of computerized multimedia presentations should be examined carefully for their effect with some students. That is, scholars in the field of education have known for quite some time that students have different learning styles, and that learning within some of those styles may not be amenable to the dynamic and fast-pace flow of images and ideas that computer assisted multimedia presentations are capable of producing.

Given the lack of empirical evidence about the effects of computed assisted multimedia presentations on students' learning, the purpose of this study is to explore the extent to which students' learning is facilitated by the use of computerized multimedia presentations in a large lecture course. In order to explore this question, students in a large lecture course that was taught using a multimedia software presentation program, PODIUM (Hofstettor, 1991) were

surveyed. Students' perceptions about media presentations, the extent of their learning and other factors surrounding multimedia were measured.

The learning style inventory selected for use in this study was created by Kolb (1985). The Kolb Learning Style Inventory is widely used both in and out of the classroom. Aside from helping learners to understand the learning process (Stice, 1987), the inventory has been used in career counseling: matching jobs to personal strengths and weaknesses (Jenkins, 1981), and even in helping understand personal relationships by exploring those strengths and weaknesses (Beutell & Kressel, 1984).

Kolb's Learning Styles Inventory is based on two assumptions: First, people learn from immediate here-and-now experience, as well as from concepts and books. Second, people learn differently, according to their preferred learning styles. Kolb found that students fall into four basic types of dominant learning styles: convergers, divergers, assimilators, and accommodators.

CONVERGER

A person with this type of learning style has dominant learning abilities in abstract conceptualization and active experimentation. This person seems to do best in a situation where there is a single, correct answer to a questions or problem. Typically, he is relatively unemotional and prefers to deal with things rather than people.

DIVERGER

This person has dominant learning abilities in concrete experience and reflective observation. Inductive reasoning and generation of new ideas are also her strengths. A diverger is usually interested in people, imaginative and emotional.

ASSIMILATOR

These students prefer learning through abstract conceptualization and reflective observation. They, like divergers, also rely on inductive reasoning, but are less involved with people and more interested in abstract concepts. If an assimilator were doing research and the facts did not agree with the theory, he would adhere to the theory.

ACCOMODATOR

The dominant learning strengths of this person are concrete experience and active experimentation. This person is the biggest risk-taker of all the learning styles, working in a trial-and-error fashion, yet relying on others instead of her own analytical ability. Perhaps her greatest strength is the ability to adapt to immediate, specific circumstances. Following this line of thinking, if an accomodator were doing research and the facts did not fit the theory, she would trust the facts.

Other research in this area has shown that understanding the different learning styles gives an instructor a greater likelihood of maximizing learning and that students learn more quickly, effectively and comfortably when learning experiences are geared to their learning needs (Kolb, 1985). Computerized multimedia classes tend to be fast moving and high-information (video segments) learning experiences. The researches were concerned that, perhaps, students with a particular learning style might be overwhelmed by the multimedia presentations. This concern led to the formulation of the following research question:

- What type of students believe that their learning was enhanced by the use of computerized multimedia presentations?

METHODS

Procedure and Sample: Over the past two years, one hundred and sixty eight students at a midsize eastern university who enrolled in a 200-level course ("Introduction to Mass Communication") that used computer assisted multimedia presentations were asked to fill out questionnaires about their learning experiences. The sample consisted of 88 (52.4%) female and 80 (47.6%) male students. The largest group students were Communication majors 63 (37.5%) while 52 (31%) were from other majors and 53 (31.5%) were underclass students who had yet to declare a major. The information by school year indicates that 42 (25%) were Freshman, 50 (29.8%) were Sophomores, 54 (32.1%) were Juniors and 19 (11.3%) were Seniors; 3 (1.8) did not indicate a year.

Questionnaire: The questionnaire the students filled out contained the "Perceptions of Multimedia Classroom Environment Survey" (see Pearson, forthcoming) and the revised Kolb Learning Styles Inventory, in addition to the demographic questions outlined above.

The Perceptions of Multimedia Classroom Environment Survey is a 36-item questionnaire that measures students' perceptions of their learning experiences with multimedia lectures on six dimensions. For the purpose of this study, and to insure that the dependent variables were not intercorrelated, only one question from each dimension was used (See Table One). The questions for this paper assessed the students' general reactions to the classroom environment (ENVIRONMENT - "I like having class in the auditorium better than having class in a regular classroom"), presentation of notes (NOTES - "Computerized class notes projected on the screen helped me learn better than written notes on the blackboard"), perception of learning (LEARNING - "I learn better when multimedia is used than when it is not used"), feeling of information overload

(INFORMATION OVERLOAD - "I found it difficult to take notes during media segments [video, radio, film, etc."]), interest in the content presented in the media segments (INTEREST - "The lectures were more interesting when media segments [video, radio, film] were used"), recall of the course content (RECALL - "Generally speaking, I remember the media segments better than I remember lecture material"), extent to which the information related to their real life experiences (REAL LIFE - "The media segments [video, radio, film, slides] made it easy for me to connect the lecture material to 'real life"), and teaching quality (TEACHING QUALITY -"Using multimedia won't make up for poor lectures").

Each of these students was also given the Kolb Learning Style Inventory (LSI), which divides students into four learning types (Divergers, Assimilators, Convergers and Accommodators) and measures students' learning styles along two continua (abstract-concrete and reflection-activity). Of the one hundred sixty eight students 26% were assimilators, 27% were accommodators, 13% were divergers, and 33% were convergers.

RESULTS

A 4 x 8 multivariate analysis of variance was performed to explore the effects of learning style (ASSIMILATOR, ACCOMODATOR, DIVERGER, CONVERGER) on students' reactions to the use of multimedia in the classroom (ENVIRONMENT, NOTES, LEARNING, INFORMATION OVERLOAD, INTEREST, RECALL, REAL LIFE, and TEACHING QUALITY). As can be seen in Table 2, no significant effects were found for any learning style ($F[4, 3154] = 2.37$, ns). Indeed, an examination of the means for each variable within each learning style indicates that students' liking of and perceived ability to learn from multimedia in the classroom are independent of learning styles (See Table 3).

Accomodators, Assimilators, Convergers and Divergers seem to have responded equally well to the use of computerized multimedia classroom presentations.

DISCUSSION

Facilitating student learning is a primary goal for most professors, thus it was important to explore the effects of computerized multimedia presentations on student perceptions of their classroom experiences and perceptions of their ability to learn. This is especially true, given the burgeoning growth of computerized multimedia technologies that are moving into our classrooms.

The researches concern that students of a particular learning style might be overwhelmed by the multimedia presentations appear to be unfounded. There was no evidence to suggest that learning styles and multimedia presentations were in any way related, hence the pedagogical benefits that can be obtained from the use of computerized multimedia classroom presentations are equally available to students of all learning styles.

It is important to note that the number of participants whose responses were analyzed in this paper was less than the optimal number necessary to conclude that there were no significant effects to be found. In order to explore the possibility that our findings resulted from a lack of statistical power, we decided to further examine the question that assessed students' perceptions of learning (i.e., "I learn better when multimedia is used than when it is not used") as well as another question from the "Perceptions of Multimedia Classroom Environment Survey" that assessed students' enjoyment of the multimedia segments ("I think the use of multimedia makes the course material more entertaining"). We discovered that two-thirds of the students reported that they learned more when multimedia was used (113 students; 67.1% either agreed or strongly agreed with this statement). Moreover, virtually all of the remaining one-third of the

students were neutral (only 5 students; 3.1% disagreed or strongly disagreed) and were evenly distributed across all four learning styles. Similarly, an extraordinary 157 students (93.7%) of the students reported that the use of multimedia segments made the class entertaining, and again, these students were evenly distributed across all four learning styles (only 3 students; 1.9% disagreed or strongly disagreed with this statement).

The fact that over nine out of ten students enjoyed the class more as a result of the use of multimedia, in addition to the students' perceptions that they learned more, allows us to state with some degree of confidence that our results are representative of those that will be found in future studies. Certainly it is evident that students enjoyed the class more as a result of the use of multimedia. Perhaps it was the students' enjoyment of the course content that allowed them to believe they learned more. Indeed, continued exploration of the relationship between multimedia's entertainment value and students' perceptions of learning is an intriguing research question to propose for future study.

Perhaps more important, however, is a second question raised by our findings--this one regarding the validity of the Kolb Learning Styles Inventory. That is, we expected at least one of the styles to differ with regard to perceptions of multimedia in the classroom, yet no differences were found. This may have resulted from our lack of power (see earlier discussion) or it may be that as the multimedia classroom presents new challenges for the teachers, it also presents new challenges for those who measure learning styles. It presents the possibility that learning style inventories, created for use in traditional classroom environments) may be inadequate for assessing student reactions to multimedia classroom environments. Thus, it may be necessary to create new learning style inventories that measure the relevant dimensions of learning from multimedia environments.

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TABLE ONE

Correlations of Included Questions
(from Perceptions of Multimedia Survey)

	Notes	Learning	Infor.	Interest	Recall	Real Life	Teaching
Environment	.2639	.1677	-.0516	.2236	.0281	.1855	.0195
Notes		.2944	.0859	.1950	.0242	.2984	.0288
Learning			.0240	.1797	.2719	.3629	-.0173
Infor. Overload				.0295	-.1215	.0232	.0875
Interest					.1788	.2511	-.0152
Recall						.2764	-.1635
Real Life							.0206

TABLE TWO

Effect of Learning Styles F-test			
Question	Error SS	Error MS	F
Environment	233.1444	1.513	1.990
Notes	120.125	.780	.393
Learning	95.115	.618	.303
Infor. Overload	198.656	1.290	2.049
Interest	96.642	.628	2.240
Recall	136.966	.889	1.082
Real Life	81.117	.527	.495
Teaching Quality	157.881	1.025	1.075

TABLE THREE

Group Means (S.D.) for Entire Group and Ss by Learning Style
(Eight Analyzed Questions)

	Entire Group	Accomodators	Assimilators	Convergers	Divergers
Environment	2.7152 (1.2420)	2.6216 (1.3406)	2.4375 (1.0700)	3.1429 (1.3148)	2.8654(1.2529)
Notes	1.8418 (.8781)	1.9189 (1.0105)	1.8333 (.7532)	1.9524 (.9207)	1.7500(.8828)
Learning	2.1835 (.7806)	2.1622 (.7643)	2.1485 (.7435)	2.3333 (.6583)	2.1731(.8794)
Infor. Overload	2.4241 (1.1471)	2.2703 (1.0967)	2.4583 (1.0907)	2.0000 (.8944)	2.6731(1.2791)
Interest	1.7595 (.8015)	1.5946 (.6438)	1.7708 (.7506)	2.1429 (.8536)	1.7115(.8930)
Recall	2.3481 (.9438)	2.1892 (1.0498)	2.4583 (.9884)	2.5714 (.8106)	2.2692(.8658)
Real Life	1.9747 (.7223)	2.0000 (.7071)	2.0000 (.6523)	2.0952 (8309)	1.8846(.7581)
Teaching Quality	2.4557 (1.0133)	2.4054 (1.0398)	2.4167 (1.0071)	2.1905 (.9808)	2.6346(1.0103)

[1] Questions were selected to represent their respective factors/dimensions on the basis of their face validity and their orthogonality with other dimensions. Interitem correlations among the questions used in this study ranged from -.1635 to .2984